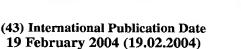
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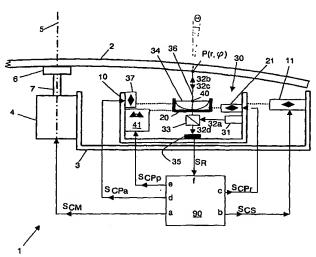
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: OPTICAL DISC DRIVE APPARATUS, METHOD FOR MEASURING TILT OF AN OPTICAL DISC, AND METHOD FOR CORRECTING TILT OF AN OPTICAL DISC



(57) Abstract: Tilt  $(\theta(r, \phi))$  is measured in a measuring location  $(P(r, \phi))$  of an optical disc (2). A pivotable objective lens (34) is brought to a first focus measuring location such as to focus a light beam (32) in a first anchor point  $(P1(r-\Delta r1, \phi))$  having the same angular coordinate  $\phi$  as said measuring location  $(P(r,\phi))$  and having a small radial distance  $\Delta r1$  from said measuring location. The objective lens is brought to a second focus measuring location such as to focus the light beam in a second anchor point  $(P2(r+\Delta r2,\phi))$  having the same angular coordinate  $\phi$  as said measuring location and having a small radial distance  $\Delta r2$  from said measuring location, wherein said first and second anchor pints are located on opposite sides of said measuring location. Tilt in said measuring location is calculated from the coordinates of said two focus measuring locations of said objective lens.



## A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G11B7/095

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#### B. FIELDS SEARCHED

 $\begin{array}{ll} \mbox{MinImum documentation searched (classification system followed by classification symbols)} \\ \mbox{IPC 7} & \mbox{G11B} \end{array}$ 

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

Category °	Citation of document, with Indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/006089 A1 (AIKOH HIDEKI ET AL) 17 January 2002 (2002-01-17) paragraphs '0015!-'0019! paragraphs '0084!-'0099!	1,8,16, 17,20,21
A	US 6 151 174 A (HENDRIKS BERNARDUS H W) 21 November 2000 (2000-11-21) column 1, line 34 -column 2, line 7 column 2, line 42 -column 6, line 30	1,8,16, 17,20,21
A	EP 0 984 439 A (SAMSUNG ELECTRONICS CO LTD) 8 March 2000 (2000-03-08) paragraphs '0012!-'0029!	1,8,16, 17,20,21
Α	EP 0 953 974 A (FUJITSU LTD) 3 November 1999 (1999-11-03) paragraphs '0009!-'0060! paragraphs '0063!-'0094!	1,8,16, 17,20,21

X Further documents are listed in the continuation of box C.	Patent family members are listed in annex.				
Special categories of cited documents:  'A' document defining the general state of the art which is not considered to be of particular relevance  'E' earlier document but published on or after the international filing date  'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  'O' document referring to an oral disclosure, use, exhibition or other means  'P' document published prior to the international filing date but later than the priority date claimed	<ul> <li>"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</li> <li>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</li> <li>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</li> <li>"&amp;" document member of the same patent family</li> </ul>				
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	1 C 5 03/02010			
Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.			
US 5 881 034 A (KANEKO KENJI ET AL) 9 March 1999 (1999-03-09) column 3, line 32-47	1,8,16, 17,20,21			
US 5 322 993 A (OHYAMA MINORU) 21 June 1994 (1994-06-21) column 3, line 28-57 column 4, line 21 -column 7, line 47	1,8,16, 17,20,21			
US 5 001 690 A (KAMIYA SHINGO ET AL) 19 March 1991 (1991-03-19) column 2, line 62 -column 3, line 12	1,8,16, 17,20,21			
EP 0 357 323 A (SHARP KK) 7 March 1990 (1990-03-07) column 2, line 11 -column 3, line 58 column 11, line 47 -column 12, line 23	1,8,16, 17,20,21			
*				
	9 March 1999 (1999-03-09) column 3, line 32-47  US 5 322 993 A (OHYAMA MINORU) 21 June 1994 (1994-06-21) column 3, line 28-57 column 4, line 21 -column 7, line 47  US 5 001 690 A (KAMIYA SHINGO ET AL) 19 March 1991 (1991-03-19) column 2, line 62 -column 3, line 12  EP 0 357 323 A (SHARP KK) 7 March 1990 (1990-03-07) column 2, line 11 -column 3, line 58			

## INTERN PNAL SEARCH REPORT

PC1 03/02810

							00/02023
	ent document in search report		Publication date		Patent family member(s)		Publication date
US	2002006089	A1	17-01-2002	JP	200208343	ВА	22-03-2002
US	6151174	Α	21-11-2000	EP WO	094314 991856	8 A1	22-09-1999 15-04-1999
				JP 	200150749	4 Т <del></del>	05-06-2001
EP	0984439	Α	08-03-2000	KR CN	200001316 124470		06-03-2000 16-02-2000
				EP	098443	9 A2	08-03-2000
				JP	200005760		25-02-2000
				US	628216 	1 B1	28-08-2001
EP	0953974	Α	03-11-1999	JP	344366		08-09-2003
				JP	200002101 095397		21-01-2000 03-11-1999
				EP US	200207577		20-06-2002
				US	200311272		19-06-2003
us	5881034	Α	09-03-1999	JP	1006407		06-03-1998
				JP	1009772	27 A	14-04-1998 
US	5322993	Α	21-06-1994	JP	319310		30-07-2001
				JP	602869	94 A	04-02-1994 
US	5001690	 А	19-03-1991	JP	119932		10-08-1989
				JP	260577 	76 B2 	30-04-1997 
EP	0357323	Α	07-03-1990	JP	201857		19-02-1996
				JP JP	206873 705855		08-03-1990 21-06-1995
				DE	6891634		28-07-1994
				DE	6891634		15-12-1994
				EP	035732		07-03-1990
				US	506538	30 A	12-11-1991